ArevaEPRDCPEm Resource

From: Pederson Ronda M (AREVA NP INC) [Ronda.Pederson@areva.com]
Sent: Thursday, February 19, 2009 6:41 PM
To: Getachew Tesfaye
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); PORTER Thomas (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 101, Supplement 1
Attachments: RAI 101 Supplement 1 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 54 of the 71 questions of RAI No. 101 on December, 2008. The attached file, "RAI 101 Supplement 1 Response US EPR DC.pdf" provides technically correct and complete responses to 16 of the remaining 17 questions, as committed.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 101 Questions 16-56, 16-57, 16-61, 16-67, 16-69, 16-72, 16-77, 16-79, and 16-103.

The following table indicates the respective pages in the response document, "RAI 101 Supplement 1 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

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The schedule for a technically correct and complete response to the remaining question has been changed and is provided below:

Question #	Response Date
RAI 101 — 16-68	April 9, 2009

Sincerely,

Ronda Pederson
ronda.pederson@areva.com

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From: Pederson Ronda M (AREVA US)
Sent: Friday, December 12, 2008 4:39 PM
To: 'Getachew Tesfaye'
Cc: PORTER Thomas (EXT); DUNCAN Leslie E (AREVA US); BENNETT Kathy A (OFR) (AREVA US); DELANO Karen V (AREVA US)
Subject: Response to U.S. EPR Design Certification Application RAI No. 101 (931), FSARCh. 16

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 101 Response US EPR DC.pdf" provides technically correct and complete responses to 54 of the 71 questions.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 101 Questions 16-58, 16-59, 16-60, 16-63, 16-64, 16-65, 16-71, 16-73, 16-75, 16-78, 16-80, 16-81, 16-83, 16-84, 16-85, 16-86, 16-87, 16-89, 16-91, 16-92, 16-93, 16-94, 16-95, 16-96, 16-97, 16-98, 16-99, 16-100, 16-101, 16-102, 16-104, 16-107, 16-109, 16-110, 16-112, 16-113, 16-114, 16-115, 16-116, 16-117, 16-118, 16-122, 16-123, and 16-124.

The following table indicates the respective page(s) in the response document, "RAI 101 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

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A complete answer is not provided for 17 of the 71 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 101 — 16-54	February 19, 2009
RAI 101 — 16-55	February 19, 2009
RAI 101 — 16-56	February 19, 2009
RAI 101 — 16-57	February 19, 2009
RAI 101 — 16-61	February 19, 2009
RAI 101 — 16-66	February 19, 2009
RAI 101 — 16-67	February 19, 2009
RAI 101 — 16-68	February 19, 2009
RAI 101 — 16-69	February 19, 2009
RAI 101 — 16-70	February 19, 2009
RAI 101 — 16-72	February 19, 2009
RAI 101 — 16-74	February 19, 2009
RAI 101 — 16-76	February 19, 2009
RAI 101 — 16-77	February 19, 2009
RAI 101 — 16-79	February 19, 2009
RAI 101 — 16-82	February 19, 2009
RAI 101 — 16-103	February 19, 2009

Sincerely,

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From: Getachew Tesfaye [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Wednesday, November 12, 2008 8:14 PM
To: ZZ-DL-A-USEPR-DL
Cc: Hien Le; Michael Marshall; Peter Hearn; Joseph Colaccino; John Rycyna
Subject: U.S. EPR Design Certification Application RAI No. 101 (931), FSARCh. 16

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on October 16, 2008, and discussed with your staff on October 28, 2008. None of the draft RAI question were modified as a result of that discussion. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

Thanks,
Getachew Tesfaye
Sr. Project Manager
NRO/DNRL/NARP
(301) 415-3361

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 229

Mail Envelope Properties (5CEC4184E98FFE49A383961FAD402D31B0D71B)

Subject: Response to U.S. EPR Design Certification Application RAI No. 101, Supplement 1
Sent Date: 2/19/2009 6:41:02 PM
Received Date: 2/19/2009 6:41:06 PM
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Files	**Size**	**Date & Time**
MESSAGE	7599	2/19/2009 6:41:06 PM
RAI 101 Supplement 1 Response US EPR DC.pdf	173962	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

Response to

Request for Additional Information No. 101 Supplement 1 (931) Revision 0

11/12/2008

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 16 - Technical Specifications
Application Section: TS Section 3.4

QUESTIONS for Technical Specification Branch (CTSB)

Question 16-54:

FSAR subsection 15.0.0.3.1, Design Plant Conditions and Initial Conditions, states, in part, "A thermal design flow of 119, 692 gpm per loop is used in the accident analysis for the RCS response. This thermal design flow is the minimum allowed by plant TSs. The analyses bound up to five percent SG tube plugging." In addition, the Westinghouse STS, NUREG-1431, specifies both the COLR limit and the SG tube plugging limit in LCO 3.4.1.

Explain the accounting for the the minimum flow rate of 119,692 gpm per loop, as listed in FSAR Table 15.0-5, in LCO 3.4.1. Based on the accounting, revise LCO 3.4.1 and related information in the TS bases B 3.4.1, as appropriate.

Response to Question 16-54:

AREVA NP Inc. has applied the methodology in Generic Letter 88-16 to develop the U.S. EPR Generic Technical Specifications (GTS). LCO 3.4.1 references the departure from nucleate boiling (DNB) parameter limits, including the minimum reactor coolant system (RCS) total flow rate limit, in the core operating limits report (COLR) and therefore contains the lowest functional capability or performance levels of equipment for safe operation of the facility, as required by 10 CFR 50.36.

The justifications presented in TSTF-487, Revision 1 and the Safety Evaluation of the NRC staff, while strictly applicable to Combustion Engineering standard technical specifications (STS), are appropriate for application to the U.S. EPR Generic Technical Specifications (GTS).

Any change to the RCS total flow rate limit would be required to be reported to the NRC by the requirements of the Core Operating Limits Report (COLR) specified in U.S. EPR FSAR Tier 2, Chapter 16 Technical Specifications, in the report requirements of section 5.6.3. Reporting of changes by this mechanism would not require an amendment to be processed by the licensee or the NRC. As stated in the U.S. EPR FSAR Technical Specification Bases for LCO 3.4.1, “These variables (pressurizer pressure, RCS average temperature, and RCS total flow rate) are contained in the COLR to provide operating and analysis flexibility from cycle to cycle.”

The Westinghouse STS, in NUREG-1431, value in the Bases for LCO 3.4.1 states steam generator (SG) tube plugging limit as a bracketed value. This is not incorporated by the U.S. EPR FSAR Tier 2, Chapter 16 Technical Specifications LCO 3.4.1 Bases.

Therefore, the U.S. EPR FSAR Tier 2, Chapter 16 Technical Specifications LCO 3.4.1 is appropriate as-is and no changes are required.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 16-55:

Revise LCO 3.4.11, SR 3.4.11.4 and the associated bases B 3.4.11 to state LCO 3.4.11.c as a Note.

LCO line items are for listing of the minimum number of plant equipment to be OPERABLE. Special operating requirement such as "Reactor coolant pumps shall not be started unless the secondary side water temperature of each steam generator is less than or equal to 50 degree F above each of the RCS cold leg temperature" should be listed as a Note to be consistent with the format used in the STS.

Response to Question 16-55:

The U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications LCO 3.4.11 and the related Bases reflect the analysis presented in U.S. EPR FSAR Tier 2, Section 5.2.2.2. Therefore, the LCO need not be changed and conforms to the format used in the Standard Technical Specifications guidance of NUREG-1431.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 16-56:

Provide information to justify the addition of Condition A and its associated Required Actions and Completion Times. Revise TS 3.4.4 and related information in the TS Bases B 3.4.4, as appropriate.

Condition A allows 3-Loop operation for up to 2 hours and entails a restart of the 4th Reactor Coolant Pump (RCP). In the Westinghouse STS, NUREG-1431, the same condition would require a unit shutdown to Mode 3. Moreover, provisions are needed to ensure that the cause of the problem is identified and corrected before restarting the idle loop or this LCO could possibly put the plant in an unanalyzed condition.

This information will be used to ensure all of the conditions specified are compatible with the actions to restore LCO operability or to exit the proposed LCO applicability.

Response to Question 16-56:

The 15 minute time limit to reduce power to less than or equal to 60 percent allows an orderly power reduction to restore the power to flow ratio of the reactor coolant system (RCS). Condition A and the associated actions reduce the number and severity of transients imposed on the RCS by a forced reduction to Mode 3.

The U.S. EPR is designed to operate at power with three reactor coolant pumps (RCP) running for a limited period of time. The two hour time limit allows for RCP restart for simple problems and includes time for investigation, correction, and evaluation of the restart of the RCP. The two hour time limit allows an RCP to be restarted in the event of simple failure or fault where the cause is identified and corrected. The RCP restart at power is evaluated in U.S. EPR FSAR Tier 2, Section 15.4. If the problem is more extensive, complex, or the two hour allowance cannot be met, the unit is required to be placed in Mode 3 within the following six hours.

The LCO 3.4.4 Bases for Conditions A and B will be modified accordingly.

FSAR Impact:

U.S. EPR FSAR Tier 2, Chapter 16 Technical Specifications Bases LCO 3.4.4 will be revised as described in the response and indicated on the enclosed markup.

Question 16-57:

Confirm that a minimum flow rate of 2200 gpm through the core is required for the performance of SR 3.4.6.1. Revise SR 3.4.6.1 and the related information in the bases B 3.4.6, as appropriate.

The BACKGROUND of TS Bases B 3.4.6 states: "In MODE 4, the flow provided by one RCP or two RHR loops is adequate for decay heat removal." Moreover, EPR FSAR Table 6.3-2 lists a normal flow rate of 2200 gpm for each LHSI/RHR pump (4400 gpm for 2 pumps running).

Response to Question 16-57:

U.S. EPR Tier 2 Chapter 16, Technical Specifications Surveillance Requirement (SR) 3.4.6.1 will be revised to conform to the wording of NUREG-1431, SR 3.4.6.1 by deleting the flow rate requirement. This is adequate because the Bases for SR 3.4.6.1 require verification every 12 hours that the required reactor coolant system (RCS) or residual heat removal (RHR) loops are in operation and circulating reactor coolant through the reactor. The verification includes flow rate, temperature, or pump status monitoring for heat removal. The Frequency of 12 hours is sufficient considering indications and alarms available to the operator in the control room to monitor RCS and RHR loop performance.

FSAR Impact:

U.S. EPR FSAR Tier 2, Chapter 16 Technical Specifications SR 3.4.6.1 will be revised as described in the response and indicated on the enclosed markup.

Question 16-61:

Revise TS 3.6.8 and related information in the TS Bases 3.6.8 to add a surveillance requirement (SR) to test a sample of trisodium phosphate (TSP) to ensure the solubility and buffering ability of TSP after exposure to the containment environment.

Response to Question 16-61:

U.S. EPR FSAR Tier 2, Chapter 16 Technical Specifications Section 3.6.8 and Bases will be revised to add a surveillance requirement and bases section to provide requirements for solubility and buffering ability of the TSP-C after exposure to the containment environment.

FSAR Impact:

U.S. EPR FSAR Tier 2, Chapter 16 Technical Specifications, Section 3.6.8 and Bases will be revised as described in the response and indicated on the enclosed markup.

Question 16-66:

TS Bases B 3.4.1, RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits.

Provide further explanation for measurement error in the second paragraph of the LCO 3.4.1 Bases discussion of LCO.

The Bases state "RCS total flow contains a measurement error based on performing a precision heat balance and using the result to calibrate the RCS flow rate indicators." The explanation should explicitly identify and describe the source of the measurement error. For example, the STS Bases provide a discussion of this measurement error due to fouling of the feedwater venturi used in the operating plants. A comparable discussion was not provided in the EPR TS Bases.

This information will be used to ensure the completeness of information provided in the TS Bases.

Response to Question 16-66:

The discussion of feedwater venturi fouling error in the Westinghouse standard technical specification bases for LCO 3.4.1 is not applicable to the U.S. EPR due to feedwater flow measurement design differences. The U.S. EPR uses an ultrasonic flowmeter to measure feedwater flow, resulting in a heat balance measurement uncertainty less than 0.5 percent. This uncertainty is applied to the reactor coolant system (RCS) total flow rate in U.S. EPR FSAR Tier 2, Chapter 16 Technical Specifications LCO 3.4.1 Bases.

The U.S. EPR refers to the term “uncertainty” instead of “error”. The flow measurement used during the precision calorimetric accounts for measurement uncertainties. The uncertainties accounted for are discussed in U.S. EPR FSAR Tier 2, Section 15.0.0.3. Deletion of the measurement error source description in the Bases for the LCO is consistent with technical specifications associated with previously approved design certifications, such as the AP 1000 description.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 16-67:

TS Bases B 3.4.10, Pressurizer Safety Valves.

Clarify the statement "the overpressure protection analysis (Ref. 3) is also based on operation of three PSRVs" in the discussion of Applicable Safety Analyses in the TS Bases B 3.4.10.

ASME OM Code, Code for Operation and Maintenance of Nuclear Power Plants, 2004 is listed as Reference 3 in the EPR TS bases. A Westinghouse topical report (WCAP-7769) on overpressure protection is also listed as Reference 3 in the STS Bases 3.4.10.

This information will be used to ensure consistency between the EPR TS and the referenced source document.

Response to Question 16-67:

Westinghouse standard technical specification (STS) in NUREG-1431, Bases Section for LCO 3.4.10, references a generic topical report (TR) for overpressure protection. This generic TR is not applicable to the U.S. EPR. Other vendor STS in NUREG-1430 and NUREG-1432 do not reference a generic TR. The U.S. EPR will not include the generic TR reference. The safety analyses section of the Bases for LCO 3.4.10 specifies Reference 3. This reference is not correct and will be deleted.

FSAR Impact:

U.S. EPR FSAR Tier 2, Chapter 16 Technical Specifications Bases LCO 3.4.10 will be revised as described in the response and indicated on the enclosed markup.

Question 16-68:

TS Bases B 3.4.11, Low Temperature Overpressure Protection (LTOP) System.

Justify that LCO 3.4.11, items a, b, c, and d, ensures LTOP is Operable and assure that it was developed from FSAR 5.2.2.2.2. Several of the mass and heat input transients were identified as being covered by other analyses without further discussion. Revise TS Bases B 3.4.11 to provide proper references or include any additional information needed to justify that LCO 3.4.11, items a, b, c, and d, ensures LTOP is Operable.

This additional information will be used to ensure that the LCO statement is accurate and complete, and adequately justified.

Response to Question 16-68:

A response to this question will be provided by April 9, 2009.

Question 16-69:

TS 3.4.11, Low Temperature Overpressure Protection (LTOP) System.

Provide the consequences if LCO 3.4.11 Condition A cannot be met. There appears to be no specific condition that would require entry into the related LCO under the circumstances given.

This additional information will be used to ensure that the LCO statement is adequately justified or needed.

Response to Question 16-69:

U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications Section LCO 3.4.11 Condition C will be modified to state that either Condition A or B not being met will require either an increase in reactor coolant system (RCS) temperature or decrease in affected accumulator pressure below the RCS pressure allowed by the pressure-temperature limits report (PTLR) requirements. This is consistent with the format of NUREG-1431. The Bases for Section 3.4.11 will be modified to reflect changes to LCO 3.4.11 Condition C.

FSAR Impact:

U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications Section LCO 3.4.11 and Bases will be revised as described in the response and indicated on the enclosed markup.

Question 16-70:

TS Bases B 3.4.11, Low Temperature Overpressure Protection (LTOP) System.

Provide a description of the most probable vent flowpath that will be opened to achieve the related requirement associated with LCO 3.4.11. Include this information in the Bases to LCO 3.4.11.

This additional information will be used to ensure that the LCO statement is complete and adequately justified.

Response to Question 16-70:

U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications Section LCO 3.4.11 Surveillance Requirements 3.4.11.3 Bases provides a description of the vent flow paths.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 16-72:

TS 3.4.14, RCS Leakage Detection Instrumentation

Provide a technical justification for the absence of CHANNEL (DIVISION) OPERATIONAL TEST, performed on the containment atmosphere radioactivity monitor at a frequency of every 92 days.

This additional information will be used to ensure that surveillance requirements are complete.

Response to Question 16-72:

The Westinghouse standard technical specification (STS) Bases surveillance requirement (SR) 3.4.15.2 referred to a channel operational test (COT) because of the inability to test one of the relays used to allow a protective function. The testing specifically referred to the change in state of a single contact of a relay to verify the channels change in state. The COT appears to be specific to the Westinghouse plants since it is not specified in NUREG-1430 or NUREG-1432 in their reactor coolant system (RCS) Leakage Detection Instrumentation sections.

The U.S. EPR uses a digital instrumentation system, and because there are no logic relays that will change state and therefore cannot be verified to change state, requires a SENSOR OPERATIONAL TEST (SOT). A SOT is the injection of a simulated or actual signal into the division as close to the sensor as practicable to verify OPERABILITY of all devices in the input circuit required for OPERABILITY. The SOT includes the verification of the accuracy and time constants of the analog input modules. The SOT may be performed by means of any series of sequential, overlapping, or total steps. The SOT is required to be performed for each required function every 24 months. The SOT will be added to the SR 3.4.14.5 and the Bases will be modified to reflect the addition of the SR.

FSAR Impact:

U.S. EPR FSAR Tier 2, Chapter 16 Technical Specifications, Section SR 3.4.14.5 and Bases will be revised as described in the response and indicated on the enclosed markup.

Question 16-74:

TS 3.4.17, RCS Loops - Test Exceptions.

Provide a technical justification as to why there are no provisions for the use of a redundant interlock during applicable Special Test Exception to prevent THERMAL POWER from exceeding the limit. Confirm that the EPR design has a Low Power Reactor Trip permissive that enables an additional degree of core protection during this test. If so, provide additional justification for not testing this function to ensure the Operability of this protective function prior to entering this LCO.

This additional information will be used to ensure that operation limits, surveillance requirements, and restrictions are adequate and complete for the proposed LCO.

Response to Question 16-74:

The U.S. EPR protective system instrumentation does not have the same permissives that are specified in NUREG-1431. There are reactor trips specified in the U.S. EPR FSAR Chapter 16 Technical Specifications, LCO 3.3.1 that limit reactor power to 10 percent of rated thermal power (RTP) from the intermediate ranges instrumentation. Therefore, the inclusion of the P-7 interlock is not appropriate for the testing exception allowance of LCO 3.4.17.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 16-76:

TS 3.4.6, RCS Loops - MODE 4.

Provide the methodology for determining the SG secondary side water level "20%" limit that is required in SR 3.4.6.3 and verify the location of this limit in the FSAR.

The information will be used to ensure that all TS specific operating parameters are verified as correct based upon values stated in the FSAR.

This RAI applies also to TS 3.4.7.

Response to Question 16-76:

Steam generator (SG) secondary side narrow range water level of span is shown in U.S. EPR FSAR Tier 2, Figure 5.4-2—Steam Generator Elevation. The figure shows that the lower tap for the narrow range (NR) level is located above the SG tubes and the upper tap is above the moisture separators. Therefore, any indication on the NR level would indicate a water level above the SG tubes. The 20 percent level is selected from the Reactor Trip requirement for Low SG Level found in U.S. EPR FSAR Tier 2, Chapter 16 Technical Specifications, LCO 3.3.1, Table 3.3.1-2 (page 2 of 6) Function 17.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 16-77:

TS 3.4.6, RCS Loops - MODE 4.

Justify the exclusion of restricting a reactor coolant pump startup with any RCS cold leg temperature less than the Low Temperature Overpressure Protection (LTOP) arming temperature. Also justify the exclusion of the secondary temperature differential restrictions when RCPs and LHSI pumps are removed from operation for a limited duration in LCO 3.4.6 .

The information will be used to ensure that all operating requirements and restrictions are adequately defined in the proposed LCOs.

Response to Question 16-77:

The Note restricting the reactor coolant pump (RCP) start with temperature less than the low temperature overpressure protection (LTOP) arming temperature will be included in the notes to U.S. EPR FSAR Tier 2, Chapter 16 Technical Specifications, LCO 3.4.6, and a description will be added to the LCO Bases.

FSAR Impact:

The U.S. EPR FSAR Tier 2, Chapter 16 Technical Specifications, LCO 3.4.6 and Bases will be revised as described in the response and indicated on the enclosed mark-up.

Question 16-79:

TS Bases B 3.4.9, Pressurizer.

Provide a clarification for the arrangement of the four heater groups and the half-capacity groups as presented in the Bases, LCO discussion. It is not clear that the half capacity heater groups provide the required capacity is met by the half capacity groups.

Discussion: If there are 12 heaters divided into four groups, then there are three heaters in each group. If each heater is rated at 24 kW, then each group is rated at 72 kW. The LCO states each group has a capacity of >144kW. Therefore, each "half-group" must be equal to a "full group" to be equivalent to 144kW (72 + 72). If it takes two groups to maintain the RCS at normal operating pressure, then the LCO requirement of 3 heater groups Operable to maintain the RCS Operable represents only a verified 50% capacity over the minimum required capacity.

Justify not requiring the four heater groups being Operable. In the Bases, furnish the design value number for pressurizer heaters currently designated Q kW and the half-value currently designated Q/2 kW in LCO, the second paragraph. It appears the pressurizer heater design value is currently designated with a place holder. Provide the location in the FSAR for the above discussion. Also, identify the location in the FSAR for the statement that the pressurizer water volume of 1240 cubic feet is equivalent to a 75% water level.

The Staff will use this change to ensure that the LCO statement is adequately justified in the supporting Bases and then verified as correct per the FSAR.

Response to Question 16-79:

The requirement for the minimum pressurizer heater capacity is contained in U.S. EPR FSAR Tier 2, Table 5.4- 7—Pressurizer Heater Capacities. This requires 288 kW of pressurizer heaters to be operating to compensate for pressurizer losses during a loss of offsite electrical power.

There is a total of four required emergency powered heater groups. Each group contains six heaters with an electrical requirement of 144 kW, with each heater requiring 24 kW. The three groups required to be OPERABLE contain 18 emergency powered heaters for a total of 432 kW (18x24kW). If a single failure occurs, the two remaining groups have sufficient capacity, 288 kW (12x24kW), to compensate for pressurizer losses during a loss of offsite power.

The 1240 cubic feet value should be 1858 cubic feet. This value is documented in U.S. EPR FSAR Tier 2 Chapter 5, Table 5.4-5—Pressurizer Design Data.

The U.S. EPR FSAR Tier 2, Chapter 16 Technical Specifications, Bases for LCO 3.4.9 and Section 5.4 will be modified to include the foregoing.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 5.4 and Chapter 16 Technical Specifications, LCO 3.4.9 will be revised as described in the response and indicated on the enclosed markup.

Question 16-82:

TS 3.4.5, RCS Loops - MODE 3.

Provide a the technical justification for the less restrictive change to the Completion Time from one to two hours for Required Action C.1 with regards to the capabilities of the Control Rod Drive Control System (CRDCS). Typically, a one hour response time is considered appropriate when the plant is placed in an unanalyzed condition.

This justification is being requested to ensure the accuracy and completeness of the LCO

Response to Question 16-82:

The Westinghouse Owners Group (WOG) standard technical specification (STS), NUREG-1431, is written from a different perspective. The WOG STS LCO 3.4.5.a. is written as having two reactor coolant system (RCS) loops operating and one of them is lost, leaving only one OPERABLE and operating loop.

The U.S. EPR FSAR Tier 2, Chapter 16 Technical Specifications limiting condition for operation (LCO) 3.4.5.a is written as having four RCS loops operating. The LCO specified in the required actions is to restore an inoperable loop or de-energize the control rod drive control system (CRDCS) while continuing to operate on three OPERABLE and operating RCS loops. The additional hour is considered acceptable considering the three operating and OPERABLE RCS loops. Comparing the number of operating loops and condition of the CRDCS and the LCO actions taken, the U.S. EPR is more restrictive and conservative.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 16-103:

TS Bases B 3.9.5, Residual Heat Removal (RHR) Loops - Low Water Level.

Provide additional information to explain a "Note" added to the EPR GTS.

Provide additional information to explain/justify the note added to the GTS Bases SR 3.9.5.2 that states that the SR is "not required to be performed until 24 hours after a required RHR loop is not in operation."

This additional information is needed to ensure the accuracy and completeness of the EPR GTS and Bases.

Response to Question 16-103:

Westinghouse owners group (WOG) standard technical specification (STS) in NUREG-1431 is consistent with an allowance provided in a Note in LCOs and SRs in Chapter 3.4 of TS. LCO 3.4.5 RCS Loops - MODE 3 SR 3.4.5.3, LCO 3.4.6 RCS Loops - MODE 4 SR 3.4.6.3, LCO 3.4.7 RCS Loops - MODE 5, Loops Filled SR 3.4.7.3, and LCO 3.4.8 RCS Loops – MODE 5, Loops Not Filled SR 3.4.8.2 allow a delay of 24 hours for the verification breaker alignment and electrical power available for a non-operating required pump. NUREG-1431 does not provide the allowance of the note in LCO 3.9.5 Residual Heat Removal (RHR) and Coolant Circulation - Low Water Level SR 3.9.5.2. This is not consistent with the operation of the required pumps in all other required MODES.

U.S. EPR FSAR Tier 2, Chapter 16 Technical Specifications limiting condition for operation (LCO) surveillance requirement (SR) 3.9.5.2 is consistent with the U.S. EPR for the following LCOs and associated SRs: LCO 3.4.5 RCS Loops - MODE 3 SR 3.4.5.3, LCO 3.4.6 RCS Loops - MODE 4 SR 3.4.6.3, LCO 3.4.7 RCS Loops - MODE 5, Loops Filled SR 3.4.7.3, and LCO 3.4.8 RCS Loops – MODE 5, Loops Not Filled SR 3.4.8.2. All of the SRs provide an allowance to delay for 24 hours the verification breaker alignment and electrical power available for required pumps. This provides consistency for OPERABILITY of the required pumps in all required MODES and a reasonable period of time to perform the required verification.

U.S. EPR FSAR Tier 2, Chapter 16 Technical Specifications, Bases for SR 3.9.5.2, will be modified to state that the SR is modified by a Note that allows 24 hours to confirm that correct breaker alignment and indicated power are available to the required pump.

FSAR Impact:

The U.S. EPR FSAR Tier 2, Chapter 16 Technical Specifications, Bases for SR 3.9.5.2 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

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Table 5.4-5—Pressurizer Design Data

Design Parameter	Value
Design pressure	2535 psig
Design temperature	684°F
Nominal operating pressure	2235 psig
Nominal operating temperature	653°F
Minimum~~Approximate~~ internal volume	2649 ft^3
Approximate volume at 75% indicated level	1858 ft^3
Minimum steam volume	883 ft^3
Maximum spray flow (total of both spray lines)	132.2 lb_m/s
Continuous spray flow (per normal spray line)	0.77 lb_m/s
Vessel nominal inside diameter	9.25 ft

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.6 RCS Loops - MODE 4

LCO 3.4.6 Two RCS loops shall be OPERABLE and one RCS loop shall be in operation.

OR

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Three Residual Heat Removal (RHR) loops shall be OPERABLE and two RHR loops shall be in operation.

----------NOTES----------

1. All reactor coolant pumps and LHSI pumps may be removed from operation for ≤ 1 hour per 8 hour period provided:

a. No operations are permitted that would cause introduction of coolant into the RCS with boron concentration less than required to meet the SDM of LCO 3.1.1, "SHUTDOWN MARGIN (SDM)"; and

b. ~~b.~~ Core outlet temperature is maintained at least 10°F below saturation temperature.

2. No RCP shall be started with any RCS cold leg temperature ≤ Low Temperature Overpressure Protection (LTOP) arming temperature specified in the PTLR unless the secondary side water temperature of each steam generator (SG) is ≤ 50°F above each of the RCS cold leg temperatures.

APPLICABILITY: MODE 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required RCS loop or one or two required RHR loops inoperable.	A.1 Initiate action to restore required loops to OPERABLE status. AND	Immediately

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	A.2 ----------NOTE---------- Only required if two RHR loops are OPERABLE. ----------	
	~~A.2~~ Be in MODE 5.	24 hours
B. Two RCS or three RHR~~more~~ required loops inoperable. OR Required loop(s) not in operation.	B.1 Suspend operations that would cause introduction of coolant into the RCS with boron concentration less than required to meet SDM of LCO 3.1.1. AND	Immediately
	B.2 Initiate action to restore one RCS loop or two RHR loops to OPERABLE status and operation.	Immediately

SURVEILLANCE REQUIREMENTS

16-57	SURVEILLANCE	FREQUENCY
SR 3.4.6.1	Verify required RCS or RHR loops are in operation. ~~and circulating reactor coolant at a flow rate of ≥ 2200 gpm.~~	12 hours
SR 3.4.6.2	Verify SG secondary side water levels are ≥ 20% for required RCS loops.	12 hours

ACTIONS

----------NOTE----------
LCO 3.0.4.b is not applicable when entering MODE 4.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Miniflow line of any MHSI pump capable of injecting into the RCS not open.	A.1 Initiate action to open miniflow line of the MHSI pump(s) capable of injecting into the RCS. OR A.2 Initiate action to verify affected MHSI pump(s) with ~~open~~ miniflow line not open is incapable of injecting into the RCS.	Immediately Immediately
B. One or more accumulators not isolated when the accumulator pressure is greater than or equal to the maximum RCS pressure for existing cold leg temperature allowed in the PTLR.	B.1 Isolate affected accumulator(s).	1 hour
C. Required Action and associated Completion Time of Condition A or B not met. 16-69	C.1 Increase RCS cold leg temperature greater than the LTOP arming temperature specified in the PTLR. OR C.2 Depressurize affected accumulator to less than the maximum RCS pressure for existing cold leg temperature allowed in the PTLR.	12 hours 12 hours

SURVEILLANCE REQUIREMENTS (Continued)

SURVEILLANCE		FREQUENCY
SR 3.4.14.4	Perform a CALIBRATION of the required containment air cooler condensate flow rate monitor.	24 months
SR 3.4.14.5	Perform SENSOR OPERATIONAL TEST of the required containment atmosphere radioactivity monitor.	24 months

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3.6 CONTAINMENT SYSTEMS

3.6.8 pH Adjustment

LCO 3.6.8 The pH adjustment baskets shall contain ≥ 211 ft^3 of trisodium phosphate (TSP-C).

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. pH adjustment baskets contain < 211 ft^3 of TSP-C	A.1 Restore pH adjustment baskets to ≥ 211 ft^3 of TSP-C.	72 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.8.1	Verify contained volume of TSP-C in the pH adjustment baskets is within limits.	24 months
SR 3.6.8.2	Verify that a sample from the TSP-C baskets provides adequate pH adjustment of In-Containment Refueling Water Storage Tank water.	24 months

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BASES

APPLICABILITY (continued)

Operation in other MODES is covered by:

LCO 3.4.5, "RCS Loops - MODE 3";
LCO 3.4.6, "RCS Loops - MODE 4";
LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled";
LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled";
LCO 3.9.4, "Residual Heat Removal (RHR) Loops - High Water Level"~~)~~; and
LCO 3.9.5, "Residual Heat Removal (RHR) Loops - Low Water Level."

ACTIONS

A.1 and A.2

16-56

If the requirements of the LCO are not met, the first Required Action is to reduce power to a level acceptable for short term three loop operation. This lower power level reduces the core heat removal needs and minimizes the possibility of violating DNB limits. The 15 minute time limit to reduce power to less than or equal to 60% allows an orderly power reduction to restore the power to flow ratio of the RCS. Condition A and the associated actions reduce the number and severity of transients imposed on the RCS by a forced reduction to MODE 3. The reduced power level allows for a restart of the RCP without violating safety analysis limits.

~~The second Required Action is to restore the RCS loop to operation.~~The U.S. EPR is designed to operate at power with 3 RCPs running for a limited period of time. The 2 hour time limit allowed for RCP to be restarted for simple problems and includes time for investigation, correction, and evaluation of the restart of the RCP if the condition is caused by a simple failure or fault where the cause is identified and corrected. The RCP restart at power is evaluated in FSAR Section 15.4. If the problem is more extensive, complex, or the 2 hour allowance cannot be met, the unit is required to be placed in MODE 3 within the following 6 hours.

~~The Completion Times of 15 minutes to reduce power is reasonable considering a Partial Reactor Trip, which is not credited in the accident analysis, will automatically perform this function. The 2 hours to restore the loop to operation is reasonable to perform minor repairs and prestart checkouts of an RCP removed from service.~~

B.1

If the Required Action and associated Completion Time of Condition A is not met or the requirements of the LCO are not met for other reasons the

BASES

LCO (continued)

The Note permits all RCPs or LHSI pumps to be removed from operation for ≤ 1 hour per 8 hour period. The purpose of the Note is to permit tests that are designed to validate various accident analyses values. One of the tests performed during the startup testing program is the validation of rod drop times during cold conditions, both with and without flow. The no flow test may be performed in MODE 3, 4, or 5 and requires that the pumps be stopped for a short period of time. The Note permits the stopping of the pumps in order to perform this test and validate the assumed analysis values. If changes are made to the RCS that would cause a change to the flow characteristics of the RCS, the input values must be revalidated by conducting the test again. The 1 hour time period is adequate to perform the test, and operating experience has shown that boron stratification is not a problem during this short period with no forced flow.

Utilization of ~~the~~ Note 1 is permitted provided the following conditions are met along with any other conditions imposed by initial startup test procedures:

16-77

a. No operations are permitted that would dilute the RCS boron concentration with coolant with boron concentrations less than required to meet SDM of LCO 3.1.1, "SHUTDOWN MARGIN (SDM)" therefore maintaining the margin to criticality. Boron reduction with coolant at boron concentrations less than required to assure SDM is maintained is prohibited because a uniform concentration distribution throughout the RCS cannot be ensured when in natural circulation; and

b. ~~b.~~ Core outlet temperature is maintained at least 10°F below saturation temperature, so that no vapor bubble may form and possibly cause a natural circulation flow obstruction.

Note 2 requires that the secondary side water temperature of each SG be ≤ 50°F above each of the RCS cold leg temperatures before the start of an RCP with any RCS cold leg temperature ≤ Low Temperature Overpressure Protection (LTOP) arming temperature specified in the PTLR. This restraint is to prevent a low temperature overpressure event due to a thermal transient when an RCP is started.

An OPERABLE RCS loop comprises an OPERABLE RCP and an OPERABLE SG, which has the minimum water level specified in SR 3.4.6.2.

Similarly for the RHR System, an OPERABLE RHR loop comprises an OPERABLE LHSI pump capable of providing forced flow to an OPERABLE LHSI heat exchanger. RCPs and LHSI pumps are

BASES

BACKGROUND (continued)

On high pressurizer level, actions are required to avoid filling of the pressurizer, which would lead to pressurization and opening of the PSRV with water overflow. The CVCS charging and auxiliary spray valves isolate on an increasing pressurizer level to perform this function. The CVCS charging isolation is normally open during operation for pressurizer level control while the CVCS auxiliary spray valve is opened during plant cooldown to reduce pressurizer temperature and provide pressure control when the RCS normal sprays are not functional (RCPs removed from service).

APPLICABLE SAFETY ANALYSES

In MODES 1, 2, and 3, the LCO requirement for a steam bubble is reflected implicitly in the accident analyses. Safety analyses performed for lower MODES are not limiting. All analyses performed from a critical reactor condition assume the existence of a steam bubble and saturated conditions in the pressurizer. In making this assumption, the analyses neglect the small fraction of noncondensible gases normally present.

Safety analyses presented in FSAR Chapter 15 (Ref. 1) do not take credit for emergency supply pressurizer heater operation; however, an implicit initial condition assumption of the safety analyses is that the RCS is operating at normal pressure.

On high pressurizer level, actions are required to avoid filling of the pressurizer, which would lead to pressurization and opening of the PSRV with water overflow. The closure of the CVCS charging and auxiliary spray valves perform this function.

The maximum pressurizer water level limit, which ensures that a steam bubble exists in the pressurizer, satisfies Criterion 2 of 10 CFR 50.36(~~d~~c)(2)(ii). Although the emergency supply heaters are not specifically used in accident analysis, the need to maintain subcooling in the long term during loss of offsite power, as indicated in NUREG-0737 (Ref. 2), is the reason for providing an LCO.

LCO

16-79

The LCO requirement for the pressurizer to be OPERABLE with a water volume ≤ ~~1240~~ 1858 cubic feet, which is equivalent to 75%, ensures that a steam bubble exists. Limiting the LCO maximum operating water level preserves the steam space for pressure control. The LCO has been established to ensure the capability to establish and maintain pressure control for steady state operation and to minimize the consequences of potential overpressure transients. Requiring the presence of a steam bubble is also consistent with analytical assumptions.

16-79

BASES

LCO (continued)

~~The LCO requires three groups of OPERABLE emergency supply pressurizer heaters, each with a capacity ≥ Q/2 kW. Four groups of pressurizer heaters are provided on separate emergency buses. Two half-capacity groups of heaters are assumed available assuming a single failure. The minimum heater capacity provided by two heater groups is sufficient to maintain the RCS near normal operating pressure when accounting for heat losses through the pressurizer insulation. By maintaining the pressure near the operating conditions, a wide margin to subcooling can be obtained in the loops. The exact design value of Q kW is derived from the use of 12 heaters rated at 24 kW each. The amount needed to maintain pressure is dependent on the heat losses.~~
Each required emergency powered heater group contains 6 heaters with an electrical requirement of 144 kW with each heater requiring 24 kW. The three groups required to be OPERABLE contain 24 emergency powered heaters for a total of 432 kW (3x6x24 kW). If a single failure occurs, one group of heaters would be inoperable and the required 288 kW needed for maintaining a bubble in the pressurizer during the design basis event would be maintained.

The LCO requires the CVCS charging and auxiliary spray valves to be OPERABLE to prevent overfilling the pressurizer which would lead to pressurization and opening of the PSRV with water overflow. For the valves to be OPERABLE they must be capable of automatically closing on the CVCS Charging Isolation on Pressurizer Level signal generated from the Protection System (LCO 3.3.1, "Protection System (PS)~~.~~").

APPLICABILITY

The need for pressure control is most pertinent when core heat can cause the greatest effect on RCS temperature, resulting in the greatest effect on pressurizer level and RCS pressure control. Thus, applicability has been designated for MODES 1 and 2. The applicability is also provided for MODE 3. The purpose is to prevent solid water RCS operation during heatup and cooldown to avoid rapid pressure rises caused by normal operational perturbation, such as reactor coolant pump startup.

In MODES 1, 2, and 3, there is a need to maintain the availability of the emergency supply pressurizer heaters. In the event of a loss of offsite power, the initial conditions of these MODES give the greatest demand for maintaining the RCS in a hot pressurized condition with loop subcooling for an extended period. For MODE 4, 5, or 6, it is not necessary to control pressure (by heaters) to ensure loop subcooling for heat transfer when the Residual Heat Removal (RHR) System is in service, and therefore, the LCO is not applicable.

BASES

APPLICABILITY (continued)

LCO 3.4.3, "RCS P/T Limits" provides the operational P/T limits for all MODES. LCO 3.4.10, "PSRVs," requires the OPERABILITY of the PSRVs that provide overpressure protection during MODES 1, 2, and 3, and MODE 4 above the LTOP arming temperature specified in the PTLR.

Low temperature overpressure prevention is most critical during shutdown when the RCS is water solid, and a mass or heat input transient can cause a very rapid increase in RCS pressure when little or no time allows operator action to mitigate the event.

ACTIONS

A Note prohibits the application of LCO 3.0.4 b to an inoperable LTOP System. There is an increased risk associated with entering MODE 4 from MODE 5 with LTOP inoperable and the provisions of LCO 3.0.4.b, which allow entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance.

A.1 and A.2

With the miniflow line of any MHSI pump not open and the MHSI pump capable of injecting into the RCS, RCS overpressurization is possible.

To immediately initiate action to restore restricted coolant input capability to the RCS reflects the urgency of removing the RCS from this condition.

B.1, C.1, and C.2

16-69

An unisolated accumulator requires isolation within 1 hour. This is only required when the accumulator pressure is at or more than the maximum RCS pressure for the existing temperature allowed by the P/T limit curves.

~~If isolation is needed and cannot be accomplished in 1 hour, Required Action C.1 and Required Action C.2 provide two options, either of which must be performed in the next 12 hours. By increasing the RCS temperature to greater than the LTOP arming temperature specified in the PTLR, an accumulator pressure of 450 psig cannot exceed the LTOP limits if the accumulators are fully injected. Depressurizing the accumulators below the LTOP limit from the PTLR also gives this protection.~~If the Required Actions of Condition A or B are not met, the plant must be brought to a MODE in which the LCO does not apply.

BASES

ACTIONS (continued)

The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions in an orderly manner and without challenging plant systems.

16-69

D.1

In MODE 4 when any RCS cold leg temperature is less than or equal to the LTOP arming temperature specified in the PTLR, with one required PSRV valve inoperable, the PSRV must be restored to OPERABLE status within a Completion Time of 72 hours. Two PSRVs are required to provide low temperature overpressure mitigation while withstanding a single failure of an active component.

The Completion Time considers the facts that only one of the PSRVs are required to mitigate an overpressure transient and that the likelihood of an active failure of the remaining valve path during this time period is very low.

DELETED MATERIAL

...that these activities can be accomplished in these time periods and on engineering evaluations indicating that an event requiring LTOP is not likely in the allowed time.

E.1

The consequences of operational events that will overpressurize the RCS are more severe at lower temperature (Ref. 7). Thus, with one of the two PSRVs inoperable in MODE 5 or in MODE 6 with the head on, the Completion Time to restore two valves to OPERABLE status is 12 hours.

The Completion Time represents a reasonable time to investigate and repair several types of relief valve failures without exposure to a lengthy period with only one OPERABLE RCS relief valve to protect against overpressure events.

F.1

The RCS must be depressurized and a vent must be established within 6 hours when:

a. Two or more required PSRVs are inoperable;

b. Any Required Action and associated Completion Time of Condition D or E is not met; or

c. The LTOP System is inoperable for reasons other than Condition A, B, C, D, or E.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.14.2, SR 3.4.14.3, and SR 3.4.14.4

These SRs require the performance of a CALIBRATION for each of the RCS leakage detection instrumentation channels. The CALIBRATION verifies the accuracy of the instrument string, including the instruments located inside containment. The Frequency of 24 months is a typical refueling cycle and considers channel reliability. Again, operating experience has proven that this Frequency is acceptable.

16-72

SR 3.4.14.5

A SOT is performed on the containment atmosphere radioactivity monitor every 24 months to ensure the instrument will perform its intended function when needed. A SOT shall be the injection of a simulated or actual signal into the division as close to the sensor as practicable to verify OPERABILITY of all devices in the instrument for OPERABILITY. The SOT shall include adjustments, as necessary, of the required alarm, interlock, and trip setpoints required for division OPERABILITY such that the setpoints are within the necessary range and accuracy. The SOT may be performed by means of any series of sequential, overlapping, or total steps.

REFERENCES

1. 10 CFR 50, Appendix A, Section IV, GDC 30.

2. Regulatory Guide 1.45.

3. FSAR ~~Chapter 5~~Section 5.2.5.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.6.8.1

The minimum amount of TSP-C is 211 ft^3. This volume is based on providing sufficient TSP to buffer the post-accident containment water to a minimum pH of 7.0. Additionally, the TSP-C volume is based on treating the maximum volume of post-accident water (628,320 gallons) containing the maximum amount of boron (1800 ppm) as well as other sources of acid. The minimum required mass of TSP-C is 12,200 pounds at an assumed assay of 100%.

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The minimum required volume of TSP-C is based on this minimum required mass of TSP-C, the minimum density of TSP-C plus margin to account for degradation of TSP-C during plant operation. The minimum TSP-C density is based on the manufactured density, since the density may increase and the volume decrease, during plant operation, due to agglomeration from humidity inside the containment. The minimum required TSP-C volume also has approximately 10% margin to account for degradation of TSP-C during plant operation.

The periodic verification is required every 24 months, since access to the TSP-C baskets is only feasible during outages, and normal fuel cycles are scheduled for 24 months. Operating experience has shown this Surveillance Frequency acceptable due to the margin in the volume of TSP-C placed in the Containment Building.

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SR 3.6.8.2

Testing must be performed to ensure the solubility and buffering ability of the TSP-C after exposure to the containment environment. A representative sample of 8.8 grams of TSP-C from one of the baskets in containment is submerged in 1.0 ± 0.05 gallon of water at a boron concentration of 1800 ppm and at the standard temperature of 25° ±5°C. Without agitation, the solution pH should be raised to ≥ 7.0 within 4 hours. The representative sample weight is based on the minimum required TSP-C weight of 12,200 pounds, which at an assumed assay of 100% corresponds to the minimum volume of 211 cubic feet, and a maximum possible post-LOCA In-Containment Refueling Water Storage Tank (IRWST) volume of 628,320 gallons, normalized to buffer a 1.0 gallon sample. The boron concentration of the test water is representative of the maximum possible boron concentration corresponding to the maximum possible post-LOCA IRWST volume. Agitation of the test solution is prohibited, since an adequate standard for the agitation intensity cannot be specified. The test time of 4 hours is necessary to allow time for the dissolved TSP-C to naturally diffuse through the sample solution. In the post-LOCA IRWST, rapid mixing would occur, significantly decreasing the

BASES

SURVEILLANCE REQUIREMENTS (continued)

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actual amount of time before the required pH is achieved. This would ensure compliance with the Standard Review Plan requirement of a pH ≥ 7.0 by the onset of recirculation after a LOCA.

REFERENCES 1. FSAR Section 6.3.

BASES

ACTIONS (continued)

B.3, B.4, and B.5

If no RHR loop is in operation, the following actions must be taken:

a. The equipment hatch must be closed and secured ~~with four bolts~~;

b. One door in each air lock must be closed; and

c. Each penetration providing direct access from the containment atmosphere to the outside atmosphere must be either closed by a manual or automatic isolation valve, blind flange, or equivalent, or verified to be capable of being closed by an OPERABLE Containment Ventilation System.

With the RHR loop requirements not met, the potential exists for the coolant to boil and release radioactive gas to the containment atmosphere. Performing the actions stated above ensures that all containment penetrations are either closed or can be closed so that the dose limits are not exceeded.

The Completion Time of 4 hours allows fixing of most RHR problems and is reasonable, based on the low probability of the coolant boiling in that time and the features available to maintain RHR operation and vessel level (Ref. 1).

SURVEILLANCE REQUIREMENTS

SR 3.9.5.1

This Surveillance demonstrates that one RHR loop is in operation and circulating reactor coolant. The minimum flow rate specified is to prevent thermal and boron stratification in the core. The Frequency of 12 hours is sufficient, considering the flow, temperature, pump control, and alarm indications available to the operator for monitoring the RHR System in the control room.

SR 3.9.5.2

16-103

Verification that the required pump is OPERABLE ensures that an additional LHSI pump can be placed in operation, if needed, to maintain decay heat removal and reactor coolant circulation. Verification is performed by verifying proper breaker alignment and power available to the required pump. The Frequency of 7 days is considered reasonable in view of other administrative controls available and has been shown to be acceptable by operating experience. This SR is modified by a Note that states the SR is not required to be performed until 24 hours after a required pump is not in operation.